

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An image processing method for implementing low-pass filtering on image data, comprising:

a similarity judging step in which similarity among pixels are judged along at least-four directions in a local area containing a target pixel undergoing low-pass filtering processing; and

C6 a direction-dependent low-pass filtering step of performing a weighted averaging operation in which weighted pixel values of pixels around ~~the~~ a target pixel are added to ~~the~~ a pixel value of said target pixel and ~~the~~ a result of said addition is divided by ~~the~~ a sum of the weights, a weighting rate along a direction manifesting marked similarity becoming increased based upon said judgement-judgment obtained in said similarity judging step, wherein:

in said similarity judging step, said similarity is judged by using:
characteristic differences among a plurality of pixels located on lines passing through said target pixel along specific directions; and
characteristic differences among a plurality of pixels located on lines passing near the target pixel along specific directions.

2. (Currently Amended) ~~An image processing method according to claim 1,~~
~~wherein:~~

~~in said similarity judging step, said similarity is judged by using either one or both of the characteristics differences in (1) and (2) below;~~

~~(1) characteristics differences among a plurality of pixels located on lines passing through said target pixel along specific directions;~~

~~(2) characteristics differences along a plurality of pixels located on lines passing near the target pixel along specific directions.~~ An image processing method for implementing low-pass filtering on image data, comprising:

a similarity judging step in which similarity among pixels are judged along four directions in a local area containing a target pixel undergoing low-pass filtering processing;
and

a direction-dependent low-pass filtering step of performing a weighted averaging operation in which weighted pixel values of pixels around a target pixel are added to a pixel value of said target pixel and a result of said addition is divided by a sum of the weights, a weighting rate along a direction manifesting marked similarity becoming increased based upon said judgment obtained in said similarity judging step, wherein:

in said similarity judging step, first similarity values tt1, yy1, nu1 and ns1 along four directions are calculated using absolute values of differences among pixel values of a plurality of pixels along each direction within said local area;

a representative value m1 is calculated by averaging or taking a median of said first similarity values tt1, yy1, nu1 and ns1 along four directions;

second similarity values tt2, yy2, nu2 and ns2 are calculated based upon said first similarity values tt1, yy1, nu1 and ns1 along four directions and said representative value m1, where at least one of second similarity values tt2, yy2, nu2 and ns2 is 0 except in a case in which said first similarity values tt1, yy1, nu1 and ns1 are same, and as said second similarity values tt2, yy2, nu2 and ns2 become larger, a degree of similarity among pixels increases, and

in said direction-dependent low-pass filtering step, weighting rates for neighboring pixels located along four directions are determined in correspondence to said calculated second similarity values tt2, yy2, nu2 and ns2, the pixel values of pixels around said target pixel are weighted by said weighting rates.

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3. (Currently Amended) An image processing method according to claim 2, wherein:

~~_____ said characteristics differences among pixels are calculated as absolute values of differences among pixel values of a plurality of pixels within said local area;~~

~~_____ in said similarity judging step;~~

~~_____ first similarity values tt1, yy1, nu1 and ns1 along at least four directions are calculated using absolute values of the differences in either said (1) or said (2) or absolute values of the differences in both said (1) and said (2);~~

~~_____ a representative value m1 of said first similarity values is calculated by averaging or taking a median of said first similarity values tt1, yy1, nu1 and ns1 along at least four directions; and~~

~~_____ nonlinear conversion below is executed based upon said first similarity values tt1, yy1, nu1 and ns1 along at least four directions and said representative value m1 to calculate second similarity values tt2, yy2, nu2 and ns2;~~

~~_____ said second similarity values tt2, yy2, nu2 and ns2 are calculated using expressions 1-4:~~

$$tt2 = \max \{m1 - tt1 + \delta, \gamma\} \dots (\text{expression 1})$$

$$yy2 = \max \{m1 - yy1 + \delta, \gamma\} \dots (\text{expression 2})$$

$$nu2 = \max \{m1 - nu1 + \delta, \gamma\} \dots (\text{expression 3})$$

$$ns2 = \max \{m1 - ns1 + \delta, \gamma\} \dots (\text{expression 4})$$

(where δ and γ in the expressions above each represents a predetermined value which may be 0); and

~~_____ in said direction dependent low-pass filtering step, weighting rates for neighboring pixels located along at least four directions are determined in correspondence to said second similarity values tt2, yy2, nu2 and ns2 that have been calculated, the pixel values~~

~~of pixels around the target pixel are weighted by said weighting rates, pixel values thus weighted are added to the pixel value of said target pixel and then the result of addition is divided by the sum of the weights.~~

4. (Original) An image processing method according to claim 1, wherein:
said image data are color image data; and
said similarity is judged based upon at least two types of color information in
said color image data in said similarity judging step.

5. (Original) An image processing method according to claim 4, wherein:
said similarity is judged based upon color image data yet to undergo
interpolation processing in said similarity judging step.

Cf 6. (Currently Amended) An image processing method according to ~~claim~~
claim 1, wherein:

said first similarity values along specific directions are calculated by using
characteristics differences along a plurality of same color pixels and/or a plurality of different
color pixels along the specific directions and similarity is judged in correspondence to said first
similarity values that have been calculated in said similarity judging step.

7. (Currently Amended) An image processing method according to claim 6,
wherein:

~~characteristics~~ characteristic differences among a plurality of different color
pixels are calculated based upon color image data having undergone white balance processing
in said similarity judging step.

8. (Currently Amended) An image processing method according to claim 6,
wherein:

a degree of saturation is detected with regard to said target pixel undergoing
low-pass filtering processing and contribution factors of ~~characteristics~~ characteristic

differences of a plurality of different color pixels are varied in correspondence to said degree of saturation that has been detected when calculating said first similarity values in said similarity judging step.

9. (Original) An image processing method according to claim 1, wherein:

said image data are image data having undergone interpolation processing to interpolate pixels with missing color components; and

said low-pass filtering processing is implemented only on target pixels having undergone said interpolation processing in said direction-dependent low-pass filtering step.

10. (Original) An image processing method according to claim 1, wherein:

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said image data are image data having undergone interpolation processing to interpolate pixels with missing color components; and

a pixel value of each pixel having undergone said interpolation processing is limited by a threshold value corresponding to a largest pixel value or a smallest pixel value in a specific area near the corresponding pixel prior to the low-pass filtering processing in the similarity judging step.

11. (Currently Amended) An image processing method according to claim 1,

~~Wherein~~wherein:

said image data are color image data having, at least, a first color with a highest pixel density and a second color with a low pixel density and vacancies of color information, said image processing method further comprising:

a color difference calculating step in which a color difference between said second color and said first color is obtained for each pixel at which said second color is present;

a color difference interpolating step in which a color difference interpolation value is obtained for a pixel at which said second color is not present based upon said color difference obtained in said color difference calculating step; and

a second color restoring step in which said second color is restored based upon said color difference interpolation value obtained in said color difference interpolating step and a pixel value of said first color, wherein:

said first color used to calculate said color difference in said color difference calculating step is said first color that has not undergone said low-pass filtering processing.

12. (Original) An image processing method according to claim 11, wherein:

said first color used in restoring said second color in said second color restoring step is said first color that has undergone said low-pass filtering processing.

13. (Currently Amended) ~~An image processing method according to claim 11,~~
~~wherein:~~ An image processing method for implementing low-pass filtering on image data,
comprising:

a similarity judging step in which similarity among pixels are judged along four
directions in a local area containing a target pixel undergoing low-pass filtering processing;
and

a direction-dependent low-pass filtering step of performing a weighted
averaging operation in which weighted pixel values of pixels around a target pixel are added to
a pixel value of said target pixel and a result of said addition is divided by a sum of the
weights, a weighting rate along a direction manifesting marked similarity becoming increased
based upon said judgment obtained in said similarity judging step, wherein:

image data has values regarding a first color and values regarding a second
color or a color difference between said second color and said first color; and

weighting rates are obtained based upon said first color and/or luminance values in which a weighting to said first color is high, and weighted averaging is performed for said second color or said color difference using said weighting rates in said direction-dependent low-pass filtering step.

14. (Canceled)

15. (Currently Amended) An image processing method according to ~~claim 1~~ claim 13, wherein:

said image data are generated by performing color separation in which reflected light from an object is captured with color filters arranged in a Bayer array; and

in said similarity judging step, a judgment is made on said similarity manifesting in said image data constituted of color separated R, G and B pixel data in an original state, G color image data generated by using said image data or ~~brightness image~~ luminance data generated by using said image data ~~in said similarity judging step~~.

16. (Currently Amended) An image processing method according to ~~claim 15~~ claim 13, wherein:

in said low-pass filtering step, low-pass filtering is implemented on G color image data generated from said image data, R color image data generated from said image data, the B color image data generated from said image data, ~~brightness image~~ luminance data generated from said image data or color difference between individual RGB colors generated from said image data based upon said similarity determined in said similarity judging step.

17-18. (Canceled)

19. (Currently Amended) A recording medium readable on a computer ~~recording~~ storing an image processing program for executing:

a similarity judging step in which similarity among pixels are judged along at least four directions in a local area containing a target pixel to undergo low-pass filtering; and

a direction-dependent low-pass filtering step of performing a weighted averaging operation in which weighted pixel values of pixels around ~~the a~~ target pixel are added to ~~the a~~ pixel value of said target pixel and ~~the a~~ result of said addition is divided by ~~the a~~ sum of the weights, a weighting rate along a direction manifesting marked similarity becoming increased based upon said judgement-judgment obtained in said similarity judging step, wherein:

image data has values regarding a first color and values regarding a second color or a color difference between said second color and said first color; and

weighting rates are obtained based upon said first color or luminance values in which a weighting to said first color is high and weighted averaging is performed for said second color or said color difference using said weighting rates in said direction-dependent low-pass filtering step.

20. (Canceled)

21. (Currently Amended) An image processing method according to ~~claim 1~~ claim 13, wherein:

in said direction-dependent low-pass filtering step, a first weighting rate, a second weighting rate, a third weighting rate, a fourth weighting rate and a fifth weighting rate are respectively applied for said target pixel, pixels above and below said target pixel, pixels next to said target pixel on the right and left, pixel above said target pixel on the right and pixel below said target pixel on the left, pixel above said target pixel on the left and pixel below said target pixel on the right; and

said second, third, fourth and fifth weighting rates along a direction manifesting marked similarity becomes increased.

22. (Previously Presented) An image processing method according to claim 21, wherein: said first weighting rate is $1/(1+2k)$, said second weighting rate is $k \times tt / (1+2k)$, said

third weighting rate is $k \times yy / (1+2k)$, said fourth weighting rate is $k \times nu / (1+2k)$ and said
fifth weighting rate is $k \times ns / (1+2k)$, where k represents a predetermined value, and tt , yy , nu
and ns satisfy the following equation: $tt+yy+nu+ns = 1$.